WASHINGTON STATE DEPARTMENT OF ECOLOGY

November 2016

GENERAL USE LEVEL DESIGNATION FOR PRETREATMENT (TSS) AND CONDITIONAL USE LEVEL DESIGNATION FOR OIL CONTROL

For

CONTECH Engineered Solutions CDS® System

Ecology's Decision:

Based on the CONTECH Engineered Solutions (CONTECH) application submissions for the CDS® System, Ecology hereby issues the following use designations for the CDS storm water treatment system:

1. **General Use Level Designation (GULD) for pretreatment use, as defined in Ecology's 2011 *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE)* Table 2, (a) ahead of infiltration treatment, or (b) to protect and extend the maintenance cycle of a basic, enhanced, or phosphorus treatment device (e.g., sand or media filter). This GULD applies to 2,400 micron screen CDS® units sized per the table below.**

2. **Conditional Use Level Designation (CULD) for oil and grease treatment. This CULD applies to 2400 micron screen CDS units sized per the table above at the water quality design flowrate as determined using the Western Washington Hydrology Model (WWHM).**

3. **The following table shows flowrates associated with various CDS models:**

		CDS Model	Water Quality Flow cfs	Water Quality Flow L/s
Precast**	Inline or Offline	CDS 2015-4	0.7	19.8
		CDS 2015-5	0.7	19.8
		CDS 2020-5	1.1	31.2
		CDS2025-5	1.6	45.3
		CDS3020-6	2	56.6
		CDS3030-6	3	85.0
		CDS3035-6	3.8	106.2
		CDS4030-8	4.5	127.4
		CDS4040-8	6	169.9
		CDS4045-8	7.5	212.4
		CDS5640-10	9	254.9
		CDS5653-10	14	396.5
		CDS5668-10	19	538.1

		CDS5678-10	**25**	7.08
Precast**	**Offline Only**	**CDS3030-V**	**3**	85
		CDS4030-7	**4.5**	127.4
		CDS4040-7	**6**	169.9
		CDS4045-7	**7.5**	212.4
		CDS5640-8	**9**	254.9
		CDS5653-8	**14**	396.5
		CDS5668-8	**19**	538.1
		CDS5678-8	**25**	708
		CDS5042	**9**	254.9
		CDS5050	**11**	311.5
		CDS7070	**26**	736.3
		CDS10060	**30**	849.6
		CDS10080	**50**	1416
		CDS100100	**64**	1812.5
Cast In Place		**CDS150134-22**	**148**	4191.4
		CDS200164-26	**270**	7646.6
		CDS240160-32	**300**	8496.2

***Specially Designed CDS Units may be approved by Ecology on a on a site-by-site basis.**
****Contact Contech for updated model numbers if PMIU, PMSU, PSW, PSWC are specified.**

4. **The water quality design flow rates are calculated using the following procedures:**

   - **Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.**

   - **Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.**

   - **Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.**

5. **The pretreatment GULD has no expiration date; however, Ecology may amend or revoke the designation.**

6. **The oil and grease CULD expires on June 30, 2017 unless extended by Ecology.**

7. **All designations are subject to the conditions specified below.**

8. **Properly designed and operated CDS systems may also have applicability in other situations (example: low-head situations such as bridges or ferry docks), for TSS and oil/grease removal where, on a case-by-case basis, it is found to be infeasible or impracticable to use any other approved practice. Jurisdictions covered under the Phase I or II municipal stormwater permits should use variance/exception procedures and criteria as required by their NPDES permit.**

9. **Ecology finds that the CDS, sized according to the table above, could also provide water quality benefits in retrofit situations.**

Ecology's Conditions of Use:

CDS systems shall comply with these conditions:

1. **Design, assemble, install, operate, and maintain CDS Systems in accordance with Contech's applicable manuals and documents and the Ecology decision and conditions specified herein. Ecology recommends use of the inspection and maintenance schedule included as Attachment 1.**

2. **Discharges from the CDS System shall not cause or contribute to water quality standards violations in receiving waters.**

3. **Contech commits to submitting a QAPP for Ecology approval by June 30, 2015 that meets the TAPE requirements for attaining a GULD for Oil Treatment. Ecology must review and approve additional QAPPs for each CULD field site in Washington State. Choose sites to reflect the product's treatment intent.**

4. **Contech shall complete all required testing and submit a TER on pretreatment and oil and grease removal for Ecology review by September 15, 2016.**

5. **Contech may request Ecology to grant deadline or expiration date extensions, upon showing cause for such extensions.**

Applicant: Contech Engineered Solutions

Applicant's Address: 11835 NE Glen Widing Drive
Portland, OR 97220

Application Documents:

- Contech Stormwater Solutions Application to: Washington State Department of Ecology Water Quality Program for General Use Level Designation – Pretreatment Applications and Conditional Use Level Designation – Oil Treatment of the Continuous Deflective Separation (CDS™) Technology (June 2007)

- Strynchuk, Royal, and England, *The Use of a CDS Unit for Sediment Control in Brevard County*.

- Walker, Allison, Wong, and Wootton, *Removal of Suspended Solids and Associated Pollutants by a CDS Gross Pollutant Trap*, Cooperative Research Centre for Catchment Hydrology, Report 99/2, February 1999

- Allison, Walker, Chiew, O'Neill, McMahon, *From Roads to Rivers Gross Pollutant Removal from Urban Waterways*, Cooperative Research Centre for Catchment Hydrology, Report 98/6, May 1998

- Quality Assurance Project Plan CDS® for Oil Treatment Performance Evaluation received by Ecology January 15th 2013.

- CDS with Sorbents Preliminary Report received by Ecology October 15th 2015.

Applicant's Use Level Request:

- General use level designation as a pretreatment device and conditional use level designation as an oil and grease device in accordance with Ecology's *Stormwater Management Manual for Western Washington.*

Applicant's Performance Claims:

- Based on laboratory trials, the CDS™ System will achieve 50% removal of total suspended solids with d_{50} of 50-µm and 80% removal of total suspended solids with d_{50} of 125-µm at 100% design flowrate with typical influent concentration of 200-mg/L.

- Contech can design the CDS™ system to achieve the effluent concentration less than 10 mg/L for total petroleum hydrocarbons.

- The CDS system equipped with standard oil baffle and addition of oil sorbent is effective in control of oil and maintain the TPH level below the Ecology-specified level (<10-mg/L) for applications in typical urban runoff pollution control.

Ecology's Recommendation:

Ecology finds that:

- The CDS™ system, sized per the table above, should provide, at a minimum, equivalent performance to a presettling basin as defined in the most recent *Stormwater Management Manual for Western Washington, Volume V, Chapter 6.*

Findings of Fact:

1. Laboratory testing was completed on a CDS 2020 unit equipped with 2400-µm screen using OK-110 sand (d_{50} of 106-µm) at flowrates ranging from 100 to 125% of the design flowrate (1.1 cfs) with a target influent of 200 mg/L. Laboratory results for the OK-110 sand showed removal rates from about 65% to 99% removal with 80% removal occurring near 70% of the design flowrate.
2. Laboratory testing was completed on a CDS 2020 unit equipped with 2400-µm screen using "UF" sediment (d_{50} of 20 to 30-µm) at flowrates ranging from 100 to 125% of the design flowrate (1.1 cfs) with a target influent of 200 mg/L. Laboratory results for the "UF" sediment showed removal rates from about 42% to 94% removal with 80% removal occurring at 5% of the design flowrate.
3. Laboratory testing was completed on a CDS 2020 unit equipped with 4700-µm screen using OK-110 sand (d_{50} of 106-µm) at flowrates ranging from 100 to 125% of the design flowrate (1.1 cfs) with a target influent of 200 mg/L. Laboratory results for the OK-110 sand showed removal rates from about 45% to 99% removal with an average removal of 83.1%.
4. Laboratory testing was completed on a CDS 2020 unit equipped with 4700-µm screen using "UF" sediment (d_{50} of 20 to 30-µm) at flowrates ranging from 100 to 125% of the design flowrate (1.1 cfs) with a target influent of 200 mg/L. Laboratory results for the "UF" sediment showed removal rates from about 39% to 88% removal with an average removal of 56.1%.
5. Contech completed laboratory testing on a CDS2020 unit using motor oil at flowrates ranging from 25% to 75% of the design flowrate (1.1 cfs) with influents ranging from 7 to 47 mg/L. Laboratory results showed removal rates from 27% to 92% removal. A spill test was also run at 10% of the design flowrate with an influent of 82,000 mg/L with an average percent capture of 94.5%
6. Independent parties in California, Florida, and Australia completed various field studies. Field studies showed the potential for the unit to remove oils and grease and total suspended solids, and capture 100% gross solids greater than the aperture size of the screen under treatment flow rate.
7. Contech is conducting a field evaluation of a CDS2015 with Sorbents for oil and grease removal. To date, the unit has been evaluated at flow rates ranging from 42% to 119% of the design flow rate (0.28cfs) with influent motor oil concentrations ranging from 0.46 to 64.8 mg/L (median of 4.5 mg/L; mean of 12.6 mg/L). A preliminary report showed a mean motor oil removal efficiency of 72%, with a UCL95 for effluent concentration of 0.75 mg/L.
8. CDS Technology has been widely accepted with over 6,200 installations in the United States and Canada. There are over 1,380 installations in Washington and Oregon.

Technology Description:

Engineers can download a technology description from the company's website.
www.conteches.com

Recommended Research and Development:

Ecology encourages Contech to pursue continuous improvements to the CDS system. To that end, Ecology makes the following recommendations:

1. Conduct testing to quantify the flowrate at which resuspension occurs.
2. Conduct testing on various sized CDS units to verify the sizing technique is appropriate.
3. Test the system under normal operating conditions, pollutants partially filling the swirl concentrator. Results obtained for "clean" systems may not be representative of typical performance.

Contact Information:

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Contech Engineered Solutions
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Applicant website: http://www.conteches.com/

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html

Ecology: Douglas C. Howie. P.E.
Department of Ecology
Water Quality Program
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Revision History

Date	Revision
July 2008	Original use-level-designation document
February 2010	Reinstate Contech's Oil Control PULD
August 2012	Revised design storm criteria, revised oil control QAPP, TER, and Expiration dates
December 2012	Revised Contech Engineered Solutions Contact Information; Added QAPP for Oil Treatment
May 2013	Revised model numbers in Attachment 1
April 2014	Revised Due dates for QAPP and TER and changed Expiration date
August 2014	Revised Due dates for QAPP and TER and changed Expiration date
March 2016	Updated Oil Control PULD to a CULD based on preliminary field monitoring results
November 2016	Revised Contech Contact information

Attachment 1
CDS Stormwater Treatment Unit Checklist

Frequency	Drainage System Feature	Problem	Conditions to Check For	Recommended Action	Date Inspected*											
					J	F	M	A	M	J	J	A	S	O	N	D
M & S	Inlet Chamber	Accumulation of trash, debris and sediment	Trash blocking inlet throat opening & sediment accumulation exceeds 2 inches	Remove trash, debris, and sediments. Inlet throat opening should not be blocked by any materials.												
A	Screen	Blockage/Damage	Biological growth on the surface of the screen; broken screen or loose screen	Powerwash screen to clean the surface and Contact CSS for screen repair (broken or loose)												
M	Separation Chamber	Trash and floatable debris accumulation	Excessive trash and floatable debris accumulation on the surface in separation chamber	Remove trash or other floatable debris in separation chamber to minimum level												
A	Oil Baffle**	Damaged	Baffles corroding, cracking, warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to design specifications.												
M & S	Oil sorbent**	Consumed	Change of color in sorbents (fresh sorbents typically appears to be white or light yellow)	Remove spent oil sorbent and replace with new sorbent												
M	Sediment Depth in the Sump	Sediment accumulation	Sediment accumulation exceeds 75-85% sump depth (varies depending on the Model, see attached Table)	Sediment in sump should be removed using vactor truck.												
M	Sediment Depth behind the screen	Sediment accumulation	Sediment accumulation exceeds 2 inches behind the screen	Sediment behind the screen should be removed using vactor truck.												

Frequency	Drainage System Feature	Problem	Conditions to Check For	Recommended Action	Date Inspected*											
					J	F	M	A	M	J	J	A	S	O	N	D
M	Access Cover (MH, Grate, cleanout)	Access cover Damaged/ Not working	One maintenance person cannot remove lid after applying 80 pounds of lift, corrosion of deformation of cover.	Cover repaired to proper working specifications or replaced.												
A	Inlet and Outlet Piping	Damaged Piping/Leaking	Any part of the pipes are crushed or damaged due to corrosion and/or settlement.	Pipe repaired or replaced.												
A	Concrete Structure	Concrete structure (MH or diversion vault) has cracks in wall, bottom, and damage to frame and/or top slab.	Cracks wider than ½ inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the structure is not structurally sound.	Structure repaired so that no cracks exist wider than 0.25 inch at the joint of inlet/outlet pipe.												
A	Access Ladder	Ladder rungs unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks. Ladder must be fixed or secured immediately.	Ladder meets design standards and allows maintenance persons safe access.												

*Note dates when maintenance was performed and type of maintenance performed in notes section below.
**May not be present on all units.

(M) Monthly from November through April.
(A) Once in late summer (preferable September)
(S) After any major storm (use 1-inch in 24 hours as a guideline).

If you are unsure whether a problem exists, please contact a Professional Engineer.

Notes:

Maintenance of CDS stormwater treatment unit typically does not require confined space entry. Visual inspections should be performed above ground. If entry is required, it should be performed by qualified personnel.

Refer to CDS Unit Operation & Maintenance Guideline for maintenance details. Typically the CDS unit needs to be inspected before and after the rainfall seasons (November to April), after any major storms (>1-inch within 24 hour) and in the event of chemical spills.

Contact Contech Engineered Solutions (CSS) (800-548-4667) if there is any damage to the internal components of CDS Unit.

CDS Maintenance Indicators and Sediment Storage Capacities

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd^3	m^3
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3